AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (cancelled):

2. (currently amended): ~~A multi-component analyzing apparatus as claimed in claim 1~~ A multi-component analyzing apparatus in which infrared light is irradiated to a measuring-subject sample which is constituted by either measuring-subject components whose sorts or quantities are limited or by a mixed article made of said measuring-subject components; intensity of infrared light having respective wavelength ranges which are fitted to infrared absorption spectra of the respective measuring-subject components among such infrared light penetrated through the measuring-subject sample is measured by employing a plurality of detectors corresponding thereto; and said multi-component analyzing apparatus includes a calculation processing unit for analyzing the infrared light intensity of the respective wavelength ranges so as to acquire concentration of the respective measuring-subject components;

wherein the calculation processing unit is operative to execute an analyzing process program for executing analysis operations of the concentration of the respective measuring-subject components by solving simultaneous equations which are constituted by equations having mutual interference correction terms used to correct interference adverse influences occurred among the respective measuring-subject components,

wherein said mutual interference correction term includes a product made by multiplying a product of concentration of at least two measuring-subject components by one, or more mutual interference correction coefficients.

3. (original): A multi-component analyzing apparatus as claimed in claim 2, wherein said mutual interference correction coefficient is such a value obtained by dividing a difference by said product of the concentration of said two measuring-subject components, while said difference is calculated between a measurement value obtained by measuring a calibration-

purpose sample formed by mixing two measuring-subject components with each other in a preselected ratio, and such a value obtained by substituting the concentration of said two measuring-subject components for such equations from which the mutual interference correction terms have been eliminated among said equations.

4. (currently amended): ~~A multi-component analyzing apparatus as claimed in claim 1~~ A multi-component analyzing apparatus in which infrared light is irradiated to a measuring-subject sample which is constituted by either measuring-subject components whose sorts or quantities are limited or by a mixed article made of said measuring-subject components; intensity of infrared light having respective wavelength ranges which are fitted to infrared absorption spectra of the respective measuring-subject components among such infrared light penetrated through the measuring-subject sample is measured by employing a plurality of detectors corresponding thereto; and said multi-component analyzing apparatus includes a calculation processing unit for analyzing the infrared light intensity of the respective wavelength ranges so as to acquire concentration of the respective measuring-subject components;

wherein the calculation processing unit is operative to execute an analyzing process program for executing analysis operations of the concentration of the respective measuring-subject components by solving simultaneous equations which are constituted by equations having mutual interference correction terms used to correct interference adverse influences occurred among the respective measuring-subject components,

wherein said equations are multi-dimensional equations; and

said analyzing process program executes a stepwise calculation processing operation by which the concentration of the respective measuring-subject components is analyzed by employing simultaneous equations which are arranged by one-dimensional equations other than said multi-dimensional equations so as to calculate approximated values as to the concentration of said respective measuring-subject components, and said multi-dimensional simultaneous equations are converged by employing said approximated values.

5. (currently amended): ~~A multi-component analyzing apparatus as claimed in claim 1~~ A multi-component analyzing apparatus in which infrared light is irradiated to a measuring-subject sample which is constituted by either measuring-subject components whose sorts or quantities are limited or by a mixed article made of said measuring-subject components; intensity of infrared light having respective wavelength ranges which are fitted to infrared absorption spectra of the respective measuring-subject components among such infrared light penetrated through the measuring-subject sample is measured by employing a plurality of detectors corresponding thereto; and said multi-component analyzing apparatus includes a calculation processing unit for analyzing the infrared light intensity of the respective wavelength ranges so as to acquire concentration of the respective measuring-subject components;

wherein the calculation processing unit is operative to execute an analyzing process program for executing analysis operations of the concentration of the respective measuring-subject components by solving simultaneous equations which are constituted by equations having mutual interference correction terms used to correct interference adverse influences occurred among the respective measuring-subject components,

wherein said calculation processing unit owns a standard sample correction coefficient which corresponds to either a ratio or a difference between measurement values of the respective detectors obtained by that while either standard samples made of single measuring-subject components or standard samples formed by mixing a plurality of measuring-subject components in predetermined concentration is employed, the respective standard samples are measured, and calculation values obtained by substituting the concentration of said standard samples for said simultaneous equations, and said standard sample correction coefficient has been stored in relation to each of said standard samples in order to further correct said simultaneous equations; and also

said analyzing process program executes the analyzing process operation in the case that while the concentration of the respective measuring-subject components acquired by said analyzing process operation is compared with the concentration of said standard sample, when the relevant standard sample is present, the standard sample correction coefficient related to said relevant standard sample is employed so as to execute said analyzing process operation.

6. (currently amended): A mixed-refrigerant analyzing apparatus comprising:

a cell to which a mixed refrigerant containing a plurality of refrigerant components is supplied as sample gas;

an infrared light source for irradiating infrared light to said cell;

a plurality of bandpass filters for penetrating therethrough infrared light having wavelengths which are fitted to infrared absorption spectra of said respective refrigerant components among infrared light which has penetrated said cell;

a plurality of detectors for measuring intensity of the infrared light which has penetrated the respective bandpass filters; and

calculation processing unit for analyzing the infrared light intensity of the respective wavelength ranges so as to acquire concentration of the respective measuring-subject components;

wherein the calculation processing unit is ~~capable of executing~~ operative to execute an analyzing process program for executing analysis operations of the concentration of the respective measuring-subject components by solving simultaneous equations which are constituted by equations having mutual interference correction terms used to correct interference adverse influences occurred among the respective measuring-subject components, and

wherein said mutual interference correction term includes a product made by multiplying a product of concentration of at least two measuring-subject components by one or more mutual interference correction coefficients.

7. (currently amended): A mixed-refrigerant analyzing apparatus comprising:

a cell to which a mixed refrigerant containing a plurality of refrigerant components is supplied as sample gas;

an infrared light source for irradiating infrared light to said cell;

a plurality of bandpass filters for penetrating therethrough infrared light having wavelengths which are fitted to infrared absorption spectra of said respective refrigerant components among infrared light which has penetrated said cell; and

a plurality of detectors for measuring intensity of the infrared light which has penetrated the respective bandpass filters;

wherein at least two bandpass filters are provided among such bandpass filters, the infrared transmission central wave numbers of which are set to 1222 to 1235 cm^{-1}, 1205 to 1220 cm^{-1}, 1180 to 1192 cm^{-1}, 1065 to 1088 cm^{-1}, 981 to 1000 cm^{-1}, 908 to 933 cm^{-1} and 798 to 820 cm^{-1}, respectively, and

wherein each range of said infrared transmission central wave number is set on the basis of a suppression of mutual interference degrees caused by said components.

8. (currently amended): A mixed-refrigerant analyzing apparatus comprising:

a cell to which a mixed refrigerant containing a plurality of refrigerant components is supplied as sample gas;

an infrared light source for irradiating infrared light to said cell;

a plurality of bandpass filters for penetrating therethrough infrared light having wavelengths which are fitted to infrared absorption spectra of said respective refrigerant components among infrared light which has penetrated said cell; and

a plurality of detectors for measuring intensity of the infrared light which has penetrated the respective bandpass filters;

wherein at least two bandpass filters are provided among such bandpass filters, the infrared transmission central wave numbers of which are set to 1263 to 1269 cm^{-1}, 1137 to 1151 cm^{-1}, 1180 to 1192 cm^{-1}, 1065 to 1088 cm^{-1}, 981 to 1000 cm^{-1}, 908 to 933 cm^{-1}, and 798 to 820 cm^{-1}, respectively, and

wherein each range of said infrared transmission central wave number is set on the basis of a suppression of mutual interference degrees caused by said components.

9. (currently amended): A mixed-refrigerant analyzing apparatus comprising:

a cell to which a mixed refrigerant containing a plurality of refrigerant components is supplied as sample gas;

an infrared light source for irradiating infrared light to said cell;

a plurality of bandpass filters for penetrating therethrough infrared light having wavelengths which are fitted to infrared absorption spectra of said respective refrigerant components among infrared light which has penetrated said cell; and

a plurality of detectors for measuring intensity of the infrared light which has penetrated the respective bandpass filters;

wherein at least two bandpass filters are provided among such bandpass filters, the infrared transmission central wave numbers of which are set to 1222 to 1235 cm^{-1}, 1137 to 1151 cm^{-1}, 1180 to 1192 cm^{-1}, 1065 to 1088 cm^{-1}, 981 to 1000 cm^{-1}, 908 to 933 cm^{-1}, and 798 to 820 cm^{-1}, respectively, and

wherein each range of said infrared transmission central wave number is set on the basis of a suppression of mutual interference degrees caused by said components.

10. (currently amended): A mixed-refrigerant analyzing apparatus comprising:

a cell to which a mixed refrigerant containing a plurality of refrigerant components is supplied as sample gas;

an infrared light source for irradiating infrared light to said cell;

a plurality of bandpass filters for penetrating therethrough infrared light having wavelengths which are fitted to infrared absorption spectra of said respective refrigerant components among infrared light which has penetrated said cell; and

a plurality of detectors for measuring intensity of the infrared light which has penetrated the respective bandpass filters;

wherein at least two bandpass filters are provided among such bandpass filters, the infrared transmission central wave numbers of which are set to 1263 to 1269 cm^{-1}, 1205 to 1220 cm^{-1}, 1180 to 1192 cm^{-1}, 1065 to 1088 cm^{-1}, 981 to 1000 cm^{-1}, 908 to 933 cm^{-1} and 798 to 820 cm^{-1}, respectively, and

wherein each range of said infrared transmission central wave number is set on the basis of a suppression of mutual interference degrees caused by said components.

11. (new): A multi-component analyzing apparatus in which infrared light is irradiated to a measuring-subject sample which is constituted by either measuring-subject components whose sorts or quantities are limited or by a mixed article made of said measuring-subject components; intensity of infrared light having respective wavelength ranges which are fitted to infrared absorption spectra of the respective measuring-subject components among such infrared

light penetrated through the measuring-subject sample is measured by employing a plurality of detectors corresponding thereto; and said multi-component analyzing apparatus includes a calculation processing unit for analyzing the infrared light intensity of the respective wavelength ranges so as to acquire concentration of the respective measuring-subject components;

wherein the calculation processing unit is operative to analyze the concentration of the respective measuring-subject components by solving simultaneous equations

by calculating a product between a concentration of a measuring-subject sample and a constant according to the following equation:

$$y_i = \sum_{j=1}^{n} \{(a_{ij}x_j + b_{ij}x_j^{\ 2} + c_{ij}x_j^{\ 3}) \times \prod_{k-1}^{n} (1 + d_{ijk}x_k)\}$$

where the symbol "i" indicates a number of a detector, the symbol "j" represents a number of a measuring-subject component, the symbol "k" represents a number of a measuring-subject component which may interfere with a j-th measuring-subject component, the symbol "n" shows a total number of measuring-subject components, the symbol "d_{ijk}" denotes a mutual interference correction coefficient defined such that when j=k, the mutual interference correction coefficient "d_{ijk}" is equal to zero, and the symbols a, b and c represent constants.

12. (new): The multi-component analyzing apparatus as recited in claim 11, wherein when the mutual interference correction term is limited by a product of the concentration of two measuring-subject components, the formula comprises:

$$y_i = \sum_{j=1}^{n} (a_{ij}x_j + b_{ij}x_j^{\ 2} + c_{ij}x_j^{\ 3}) + \sum_{j=1}^{n} \sum_{k=j+1} d_{ijk}x_j x_k \cdots$$